BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: VII**
BRANCH: EEE **SESSION : MO/2018**

SUBJECT : EE8215 HIGH VOLTAGE ENGINEERING

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) Explain the secondary ionisation process? [2]
(b) How are the electric stress/ electric field intensity controlled? [3]

Q2 Air at atmospheric pressure breaks down at a stress of approximately 3 kV/mm. Consider the following configurations and estimate the voltage where breakdown (or corona) starts: [5]

Fields

i. A uniform field gap of 100 mm
ii. Two co-axial cylinders: radius of outer cylinder 110 mm, inside cylinder radius 10 mm.
iii. Two concentric spheres: radius of outer sphere 110 mm, inside sphere radius 10 mm.

Discuss the results.

Q3 (a) What is time lag? Which factors affect the time lag? [2]
(b) Assume A=12, B=365 and γ=0.02 for air. Determine $(pd)_{min}$ and V_{min}. [3]

Q4 (a) What are commercial liquid dielectrics, how they are different from pure liquid dielectrics? [2]
(b) Why are both electrical and thermal properties important for liquid for use in an apparatus like a transformer? [3]

Q5 (a) Breakdown Voltage of pure liquid depends on what factors? [2]
(b) Explain the phenomenon “treeing and tracking” in solid insulating materials under electrical stress. How does it lead to breakdown? [3]

Q6 (a) What are the characteristics of a good solid dielectric? [2]
(b) How does the internal discharges phenomenon leads to breakdown in solid insulation? [3]

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